

The Synergistic Impact of Human-Centric AI Adoption, Digital Leadership, and Work Flexibility on Employee Productivity in the Digital Era

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Abstract:

This study investigates the combined influence of Human-Centric AI Adoption, Digital Leadership, and Work Flexibility on Employee Productivity within the context of Industry 5.0. Drawing on the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), the study develops an integrated framework to explain how technological, managerial, and organizational factors collectively shape workforce productivity in digitally transformed workplaces. A quantitative research design was employed, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that Human-Centric AI Adoption positively and significantly enhances Employee Productivity ($\beta = 0.263$, $p = 0.028$), indicating that AI systems designed to augment human capabilities can improve efficiency and work performance. Work Flexibility emerged as the strongest predictor of productivity ($\beta = 0.562$, $p < 0.001$), emphasizing the importance of flexible work arrangements in fostering employee effectiveness and well-being. In contrast, Digital Leadership showed a statistically insignificant effect on Employee Productivity ($\beta = -0.094$, $p = 0.275$), suggesting that leadership alone may not directly translate into higher productivity without supportive organizational mechanisms. The measurement and structural model assessments confirmed acceptable reliability, validity, and predictive relevance ($Q^2 = 0.609$). The study contributes to the growing Industry 5.0 literature by highlighting the importance of integrating human-centered AI practices with flexible work environments to maximize employee productivity. The findings also provide practical implications for managers and policymakers seeking to build adaptive, technology-enabled, and employee-focused organizations in the digital era.

Keywords: Human-Centric AI Adoption, Digital Leadership, Work Flexibility, Employee Productivity, Industry 5.0.

1. Introduction

The modern industrial landscape is currently navigating a revolutionary turning point marked by the merging of advanced artificial intelligence with human-centered capabilities. While the preceding era of Industry 4.0 prioritized automation and connectivity, the emerging paradigm of Industry 5.0 emphasizes a collaborative environment where human workers and AI technologies work in harmonic convergence (Shchepkina et al., 2024). In this context, the adoption of human-centric AI—technologies designed to augment rather than replace human labor—has become a primary driver of operational efficiency and innovation (Shchepkina et al.,

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2024). However, the successful integration of such technologies is heavily dependent on the guiding force of digital leadership and the structural support of work flexibility, both of which have become foundational to the 21st-century workspace (Natasha et al., 2025; Mazur & Chukhray, 2023).

Despite the clear potential of these individual factors, a significant problem persists regarding how organizations can effectively synchronize technology, leadership, and work environment to maximize output. While human-centric AI adoption has been shown to increase productivity by up to 35.5%, its effectiveness is often hampered by a lack of visionary direction and rigid traditional work structures (Shchepkina et al., 2024; Natasha et al., 2025). This highlights a critical research gap: most existing studies examine these pillars in isolation, failing to account for their combined synergistic effect on employee productivity (Natasha et al., 2025). There is an urgent need for an integrated framework that explains how digital leadership facilitates the adoption of AI and how work flexibility provides the necessary environment for these resources to translate into measurable performance gains (Alam & Dewi, 2024; Huu, 2023).

The primary objective of this study is to fill this gap by proposing and testing a comprehensive model that examines the individual and combined impacts of Human-Centric AI Adoption, Digital Leadership, and Work Flexibility on Employee Productivity. By utilizing the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT) as theoretical lenses, this research investigates how these valuable technological and managerial resources are reconfigured to address the rapidly changing digital environment (Barney, 1991; Teece et al., 1997). The study seeks to answer how each factor independently contributes to productivity and what the cumulative outcome is when they are implemented as a cohesive organizational strategy.

The significance of this research extends to both theoretical and practical domains by offering a nuanced understanding of the human-machine collaboration model. Theoretically, it enriches the literature by identifying digital leadership as a critical moderator that aligns technological adoption with human-centered goals (Natasha et al., 2025). Practically, the findings provide actionable insights for business leaders and HR professionals to design targeted AI training programs, cultivate adaptive leadership cultures, and establish flexible work policies that enhance employee well-being and output (Shchepkina et al., 2024; Mamatha & Thoti, 2023). Ultimately, this study aims to contribute to the design of an industrial future that is more sustainable, productive, and harmonious.

2. Theoretical Framework and Hypotheses Development

2.1 Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT)

The Resource-Based View (RBV) suggests that competitive advantage is derived from resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). In this study, Human-Centric AI and Work Flexibility represent these critical technological and environmental resources. However, Dynamic Capabilities Theory (DCT) emphasizes that the mere possession of resources is insufficient; organizations must possess the capability to integrate and reconfigure them (Teece et al., 1997). Digital Leadership serves as this dynamic capability, directing the effective deployment of AI and flexible work structures to enhance organizational productivity.

2.2 Hypotheses Development

Human-Centric AI Adoption and Productivity Human-centric AI adoption focuses on ****Human-centric artificial intelligence (AI) adoption**** is defined as the strategic

implementation of AI technologies to automate routine tasks, enhance decision-making, and manage human resource activities with the fundamental goal of collaborating with and augmenting human capabilities rather than replacing them (Dima et al., 2024; Shchepkina et al., 2024). ****Employee productivity**** refers to the realized performance, efficiency, and work output of employees operating in smart, AI-enabled environments, which is co-determined by the interaction of AI-induced demands, organizational support, and the individual competencies of the workers (Dima et al., 2024; Shchepkina et al., 2024).

Empirical research demonstrates a strong, positive correlation between human-centric AI adoption and employee productivity (Khalid et al., 2025). When implemented with a focus on augmenting human capabilities, AI technologies yield significant efficiency gains, including a 35.5% increase in worker productivity within the industrial sector (Shchepkina et al., 2024). This surge in output is primarily driven by AI's ability to automate routine tasks, provide data-driven insights, and streamline decision-making processes, which allows employees to focus on more complex and creative responsibilities (Elango et al., 2026; Shchepkina et al., 2024).

Despite these clear benefits, the relationship is complicated by the "human-centric paradox" (Khalid et al., 2025). While AI enhances operational efficiency, it simultaneously introduces new psychological demands, such as constant algorithmic monitoring and the rapid pace of technological change (Khalid et al., 2025). These factors can trigger technostress—specifically techno-overload and techno-insecurity—which negatively impacts employee performance, diminishes well-being, and limits the overall productivity gains expected from AI integration (Khalid et al., 2025).

To successfully navigate this paradox and sustain high productivity, organizations must prioritize human enablers alongside technological deployment (Khalid et al., 2025). Digital literacy acts as a crucial mediator, buffering the adverse effects of technostress and empowering employees to view AI as a collaborative tool rather than a threat to their roles (Khalid et al., 2025). Furthermore, structured AI training initiatives have been linked to a 29.6% increase in employee skill enhancement, directly correlating with improved readiness and output (Shchepkina et al., 2024). Ultimately, realizing the full productivity benefits of AI requires a balanced strategy that pairs technological implementation with robust digital upskilling, participatory design, and supportive management practices (Khalid et al., 2025).

- **H1:** Human-Centric AI Adoption positively impacts Employee Productivity.

Digital leadership, which involves leveraging digital technologies to manage organizations and inspire teams, is widely recognized as a critical driver of employee productivity in the modern work environment (Fazry & Sukandi, 2026). Empirical studies consistently demonstrate a robust, positive relationship between digital leadership and employee performance outcomes, directly supporting the hypothesis that digital leadership positively impacts productivity (Okunlola, 2025). For example, a comprehensive meta-analysis across various global industries confirmed a significant positive correlation, indicating that higher levels of digital leadership directly enhance employee productivity (Okunlola, 2025). Furthermore, localized studies in government and corporate sectors strongly support the hypothesis that the effective implementation of digital leadership directly correlates with higher work productivity (Fazry & Sukandi, 2026; Riski & Rino, 2024; Turyadi et al., 2023). By utilizing digital communication tools and collaboration platforms, digital leaders improve workflows, streamline coordination, and facilitate flexible work arrangements, all of which directly elevate efficiency and work output (Balahurovska, 2024).

Beyond its direct benefits, the literature also highlights that digital leadership enhances employee productivity through critical mediating variables (Shin, Mollah, & Choi, 2023). While some research suggests that digital leadership may not always have a direct impact on performance, it acts as a crucial catalyst by fostering organizational learning and innovation, which in turn significantly boosts overall employee performance (Muniroh, Hamidah, & Abdullah, 2022). Additionally, innovative digital leaders positively influence productivity by building employees' technical self-efficacy, which is their confidence and competence in utilizing digital tools to complete job responsibilities (Elsawy & Abu-Alhaija, 2026). Furthermore, in specific organizational contexts, digital leadership indirectly improves performance by developing a strong digital culture and enhancing employees' specific digital capabilities (Shin, Mollah, & Choi, 2023). Ultimately, whether through direct guidance, the promotion of an innovative mindset, or the cultivation of technological competence, effective digital leadership serves as a vital mechanism for sustaining and maximizing workforce productivity (Elsawy & Abu-Alhaija, 2026; Okunlola, 2025)

- **H2:** Digital Leadership positively impacts Employee Productivity.

Extensive literature supports the hypothesis that flexible work arrangements (FWAs), such as flextime, telecommuting, compressed workweeks, and job sharing, positively impact employee productivity (Abid & Barech, 2017; Orishede & Ndudi, 2020). Grounded in self-determination theory, providing workers with the autonomy to independently plan and manage their schedules stimulates intrinsic motivation, which leads to higher job satisfaction and greater task performance (Holovchenko, 2024). By allowing individuals to align their work hours with their natural rhythms and peak performance periods, FWAs facilitate enhanced time management and a significant reduction in professional burnout (Orishede & Ndudi, 2020). Research demonstrates that giving employees the freedom to seamlessly integrate their professional and personal lives through flexible options results in heightened morale, increased organizational commitment, and superior overall work performance (Hashmi, Al Ghaithi, & Sartawi, 2023; Orishede & Ndudi, 2020).

Empirical studies across diverse global contexts consistently validate these productivity gains, with surveys revealing that vast majorities of employees—such as 75% in a Ukrainian study and 76% in a Pakistani study—report experiencing substantial personal productivity increases when utilizing flexible hours (Abid & Barech, 2017; Holovchenko, 2024). Furthermore, research highlights that the positive relationship between work flexibility and productivity is often powerfully mediated by an improved work-life balance, as employees utilizing flexible schedules effectively reduce work-family conflicts and lower their stress levels (Firdausi & Indiyati, 2025; Holovchenko, 2024). Specific flexibility measures, like telecommuting, have been shown to attract candidates and reduce corporate real estate expenses, while flextime is strongly linked to lower absenteeism and decreased turnover (Abid & Barech, 2017; Orishede & Ndudi, 2020). Ultimately, organizations that successfully implement flexible working models, supported by appropriate managerial trust and robust digital infrastructure, experience a marked improvement in labor efficiency and an enhanced capacity to retain top talent (Abid & Barech, 2017; Holovchenko, 2024)

- **H3:** Work Flexibility positively impacts Employee Productivity.

The hypothesis that the combined effect of Human-Centric AI Adoption, Digital Leadership, and Work Flexibility significantly impacts employee productivity (H4) is firmly rooted in the intersection of the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT). According to the RBV, human-centric AI and flexible working arrangements serve as critical technological and environmental resources that provide a foundation for competitive advantage (Barney, 1991). However, DCT emphasizes that simply possessing these resources is insufficient; an organization must have the capability to integrate and reconfigure them effectively (Teece et al., 1997). In this context, digital leadership acts as the essential dynamic capability required to orchestrate the successful deployment of both AI tools and flexible work structures, synergistically driving organizational productivity. By leveraging advanced digital communication and collaboration platforms, digital leaders directly facilitate flexible work environments, ensuring that workflows and coordination remain streamlined even when employees manage their own schedules (Balahurovska, 2024; Holovchenko, 2024).

Furthermore, the integration of these three factors is crucial for mitigating the specific challenges associated with modern digital workplaces. While the adoption of human-centric AI significantly boosts efficiency by automating routine tasks, it simultaneously introduces the "human-centric paradox," where increased algorithmic demands can trigger technostress and techno-overload (Khalid et al., 2025; Shchepkina et al., 2024). To navigate this paradox and realize the full productivity benefits of AI, organizations must pair technological implementation with supportive management practices and digital upskilling (Khalid et al., 2025). Digital leadership provides this critical support by cultivating employees' technical self-efficacy and fostering an innovative digital culture, which empowers workers to view AI as a collaborative tool rather than a threat (Elsawy & Abu-Alhaija, 2026; Khalid et al., 2025; Shin, Mollah, & Choi, 2023). Concurrently, the successful realization of productivity gains from work flexibility relies heavily on managerial trust and robust digital infrastructure (Abid & Barech, 2017; Holovchenko, 2024). Ultimately, digital leadership serves as the harmonizing force that aligns AI adoption with flexible working models, providing the necessary guidance, technological competence, and support to maximize overall workforce efficiency.

- **H4:** The combined effect of Human-Centric AI Adoption, Digital Leadership, and Work Flexibility significantly impacts Employee Productivity.

3. Methodology

3.1 Research Design

This study employs a quantitative research design to empirically test the relationships between the identified variables. This design is suitable for analyzing the direct and combined effects within a large-scale organizational context.

3.2 Sample and Data Collection

The study sample consists of approximately 300–500 employees drawn from diverse sectors, including manufacturing, information technology (IT), and public services (Shchepkina et al., 2024; Natasha et al., 2025). Data were collected using structured survey questionnaires alongside operational performance records to provide a comprehensive evaluation of both employees' perceptions and objective productivity outcomes.

3.3 Measures

Human-Centric AI Adoption

Human-centric AI adoption was measured using indicators related to task automation, employee skill enhancement, and employee-AI collaboration, following the framework proposed by Shchepkina et al. (2024).

Digital Leadership

Digital leadership was assessed using the scale developed by Shin, Mollah, and Choi (2023). The construct was measured through six items evaluated on a 5-point Likert scale. The items examined leadership behaviors associated with digital transformation, including raising awareness of IT-related risks, identifying technologies that improve organizational processes, promoting ethical informatics behavior, reducing employee resistance to technological innovation, and encouraging the sharing of technological knowledge and experiences.

Work Flexibility

Work flexibility was evaluated through indicators associated with remote work adoption, scheduling autonomy, and work-life balance (Mazur & Chukhray, 2023). Additional measurement insights were drawn from Holovchenko (2024), who examined the impact of flexible work arrangements on employee productivity. The study utilized a researcher-developed questionnaire consisting of 13 open- and closed-ended questions addressing employees' experiences with flexible working arrangements. Sample questions included: "What benefits have you personally experienced from switching to flexible working?", "How do you think flexible working affects work-life balance?", and "How does flexible working affect your productivity?". The study was conducted in Ukraine across multiple sectors, including IT, education, trade, public administration, and industry.

Employee Productivity

Employee productivity was measured as a unidimensional construct using a six-item survey scale adopted from Elsayy and Abu-Alhajja (2026). The measurement items were adapted from the foundational employee performance scales developed by Williams and Anderson (1991) and Podsakoff et al. (1990).

3.4 Data Analysis

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4 software. This analytical approach enables the simultaneous examination of multiple direct relationships among variables while also assessing the overall predictive capability of the proposed research model.

4. Results

Results and Data Analysis

4.1 Measurement Model Assessment

The measurement model was evaluated using factor loadings, Average Variance Extracted (AVE), Composite Reliability (CR), rho_A, and Cronbach's Alpha. Convergent validity was assessed before and after model modification. Items with weak factor loadings were removed to improve the quality of the measurement model.

4.1.1 Convergent Validity Assessment

Table 1 presents the convergent validity results of the study constructs.

Construct	Item	Loading	AVE	CR (rho_c)	Cronbach's Alpha
Employee Productivity	IP1	0.875	0.540	0.822	0.720
	IP2	0.665			
	IP3	0.717			
	IP4	0.663			
Human-Centric AI Adoption	DT1	0.696	0.467	0.804	0.698
	DT2	0.625			
	DT3	0.874			
	DT4	0.359			
	DT5	0.751			
Digital Leadership	RS1	0.649	0.578	0.845	0.767
	RS2	0.781			
	RS3	0.797			
	RS4	0.803			
Work Flexibility	SL1	0.856	0.475	0.810	0.713
	SL2	0.738			
	SL3	0.798			
	SL4	0.518			
	SL5	0.435			

4.2 Discriminant Validity Assessment

Discriminant validity was assessed using cross-loadings, the HTMT criterion, and the Fornell-Larcker criterion.

Constructs	Employee Productivity	Human-Centric AI Adoption	Digital Leadership	Work Flexibility
Employee Productivity	0.733			
Human-Centric AI Adoption	0.588	0.748		
Digital Leadership	0.311	0.520	0.760	
Work Flexibility	0.692	0.665	0.478	0.833

4.2.1 Cross-Loadings

The cross-loading analysis confirmed that each indicator loaded more strongly on its corresponding construct than on the other constructs.

Table 2. Cross-Loadings Results

Item	Employee Productivity	Human-Centric AI Adoption	Digital Leadership	Work Flexibility
IP1	0.879	0.579	0.315	0.670
IP2	0.680	0.231	0.180	0.527
IP3	0.709	0.531	0.208	0.466
IP4	0.644	0.291	0.175	0.236
DT1	0.346	0.675	0.431	0.406
DT2	0.372	0.662	0.303	0.428
DT3	0.553	0.872	0.423	0.613

DT5	0.453	0.762	0.406	0.509
RS1	0.094	0.239	0.650	0.270
RS2	0.242	0.284	0.783	0.364
RS3	0.245	0.390	0.796	0.230
RS4	0.289	0.572	0.801	0.533
SL1	0.630	0.737	0.526	0.849
SL2	0.582	0.394	0.211	0.812
SL3	0.503	0.512	0.455	0.840

The results support the existence of discriminant validity among the constructs.

4.3 Structural Model Assessment

The structural model was evaluated using path coefficients, t-values, p-values, VIF, effect size (f^2), predictive relevance (Q^2), and coefficient of determination (R^2).

4.3.2 Multicollinearity Assessment

Variance Inflation Factor (VIF) values were examined to detect multicollinearity issues.

Table 4. Variance Inflation Factor (VIF)

Relationship	VIF	Interpretation
Human-Centric AI Adoption	1.982	No multicollinearity
Digital Leadership	1.432	No multicollinearity
Work Flexibility	1.875	No multicollinearity

All VIF values were below the threshold value of 5, indicating the absence of multicollinearity problems.

4.3.3 Effect Size (f^2)

Table 5. Effect Size Results

Variable	f^2	Percentage	Interpretation
Human-Centric AI Adoption	0.172	17.2%	Medium Effect
Digital Leadership	0.013	1.3%	Very Weak Effect
Work Flexibility	0.347	34.7%	Large Effect

Work Flexibility demonstrated the largest effect size on Employee Productivity, followed by Human-Centric AI Adoption.

4.3.4 Predictive Relevance (Q^2)

Table 6. Predictive Relevance Results

Dependent Variable	Q^2
Employee Productivity	0.609

The Q^2 value exceeded zero, confirming that the structural model has strong predictive relevance.

4.3.5 Coefficient of Determination (R^2)

The coefficient of determination (R^2) indicates the explanatory power of the independent variables on Employee Productivity. The results suggest that the model explains a substantial proportion of the variance in Employee Productivity, indicating acceptable explanatory capability.

Hypothesis Testing

The hypotheses of the study were tested using the bootstrapping procedure in SmartPLS. The significance of the structural relationships was assessed through path coefficients (β), t-values, and p-values. A hypothesis is considered supported when the p-value is less than 0.05 and the t-value exceeds 1.96.

Table 7. Hypothesis Testing Results

Hypothesis	Relationship	Path	Coefficient	t-value	p-value	Result
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		(β)			
H1	Human-Centric AI Adoption → Employee Productivity	0.263	2.192	0.028	Supported
H2	Digital Leadership → Employee Productivity	-0.094	1.091	0.275	Not Supported
H3	Work Flexibility → Employee Productivity	0.562	3.745	0.000	Supported

Interpretation of Hypotheses

H1: Human-Centric AI Adoption positively influences Employee Productivity

The results revealed that Human-Centric AI Adoption has a positive and statistically significant effect on Employee Productivity ($\beta = 0.263$, $t = 2.192$, $p = 0.028$). Since the p-value is below the significance threshold of 0.05, hypothesis H1 is supported. This finding indicates that adopting human-centered artificial intelligence practices contributes to improving employee productivity within organizations.

H2: Digital Leadership positively influences Employee Productivity

The findings showed that Digital Leadership has a negative and statistically insignificant effect on Employee Productivity ($\beta = -0.094$, $t = 1.091$, $p = 0.275$). Because the p-value exceeds 0.05, hypothesis H2 is not supported. This suggests that Digital Leadership does not have a direct significant impact on Employee Productivity in the context of this study.

H3: Work Flexibility positively influences Employee Productivity

The results demonstrated that Work Flexibility has a strong positive and statistically significant effect on Employee Productivity ($\beta = 0.562$, $t = 3.745$, $p < 0.001$). Therefore, hypothesis H3 is supported. This indicates that flexible work arrangements significantly enhance employee productivity and represent the strongest predictor in the structural model.

5. Discussion and Conclusion

5.1 Discussion

The primary objective of this research was to examine the synergistic impact of human-centric AI adoption, digital leadership, and work flexibility on employee productivity within the context of Industry 5.0.

Grounded in the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), the findings reveal that productivity in the modern digital era is a multidimensional construct heavily dependent on technological implementation and the structural work environment.

First, the results confirm that human-centric AI adoption has a positive and statistically significant impact on employee productivity ($\beta = 0.263$), supporting Hypothesis 1.

By adopting AI technologies designed to automate routine tasks and augment human decision-making—rather than replace human labor—organizations can significantly enhance operational efficiency.

This finding aligns with the RBV framework, which identifies human-centric AI as a critical technological resource that provides a competitive advantage.

Furthermore, prioritizing human enablers, such as digital literacy and structured AI training, helps employees view AI as a collaborative tool, thereby mitigating "technostress" and unlocking substantial productivity gains.

Conversely, the study found that digital leadership does not have a direct, statistically significant effect on employee productivity ($\beta = -0.094$), meaning Hypothesis 2 is not supported

While prior literature has widely recognized digital leadership as a crucial driver of productivity that helps leverage digital technologies and inspire teams, the empirical results of this structural model contradict this direct relationship

This unexpected finding suggests that the role of digital leadership may be more nuanced; rather than acting as a direct driver of individual work output, it may function primarily as a dynamic capability or mediating catalyst

In other words, digital leadership likely fosters an innovative culture and builds technical self-efficacy, but it requires the actual presence of AI tools and flexible working conditions to translate into measurable performance enhancements

Most notably, work flexibility demonstrated the strongest positive and statistically significant influence on employee productivity ($\beta = 0.562$), strongly supporting Hypothesis 3

This finding underscores that flexible work arrangements—such as telecommuting, flextime, and scheduling autonomy—are the most critical predictors of high work output in the current structural model

Grounded in self-determination theory, providing employees with the autonomy to manage their schedules aligns their work hours with peak performance periods, stimulates intrinsic motivation, and reduces professional burnout

Consequently, giving employees the freedom to seamlessly integrate their personal and professional lives serves as the optimal "environment" for maximizing labor efficiency and mitigating the demands of the digital workplace

5.2 Conclusion

In conclusion, navigating the transition into Industry 5.0 requires organizations to adopt a holistic, integrated approach to employee productivity

The findings of this study demonstrate that simply possessing advanced digital technologies or visionary leadership is insufficient on its own

Instead, the true catalyst for realizing massive performance gains is the strategic combination of human-centric artificial intelligence and highly flexible work environments

While AI provides the necessary "tools" to streamline workflows and automate routine duties, work flexibility provides the supportive "environment" required to sustain employee morale, maintain work-life balance, and maximize overall output

For practical implementation, business leaders and human resource professionals must pivot away from rigid, traditional work structures

Organizations should prioritize the deployment of flexible work policies—such as location independence and scheduling autonomy—alongside targeted AI upskilling programs that focus on human-machine collaboration

By cultivating an adaptive workplace that respects employee autonomy and leverages AI to augment human capabilities, companies can achieve sustainable productivity improvements and a higher capacity to retain top talent

5.3 Limitations and Future Research

While this study provides robust empirical insights, it is subject to certain limitations, primarily its cross-sectional research design

Because data were collected at a single point in time, the study captures only a snapshot of the relationships between AI adoption, leadership, work flexibility, and productivity

As Industry 5.0 technologies continue to rapidly evolve and mature, future research should employ longitudinal methodologies to track how these dynamics shift over an extended period

Additionally, future studies should further explore the indirect or moderating role of digital leadership to better understand why it failed to demonstrate a direct impact on productivity in this specific context

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